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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,807	06/20/2005	Hiroyuki Honda	274135US0PCT	6688
22850	7590	08/17/2006	EXAMINER	
C. IRVIN MCCLELLAND OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			CHU, YONG LIANG	
			ART UNIT	PAPER NUMBER
			1626	

DATE MAILED: 08/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/539,807	<b>Applicant(s)</b> HONDA ET AL.	
	<b>Examiner</b> Yong Chu	<b>Art Unit</b> 1626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 May 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>06/20/05, 05/18/06</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

Claims 1-8 are pending in the instant application.

### **Priority**

This application is a 371 of PCT/JP02/13314, filed on 19 December 2002.

### ***Information Disclosure Statement***

Applicant's Information Disclosure Statements, filed on 20 June 2005 and 18 May 2006, have been considered. Please refer to Applicant's copies of the PTO-1449 submitted herewith.

### ***Status of the Claims***

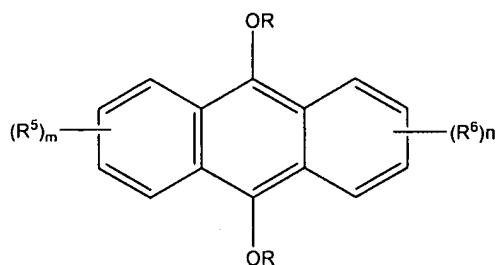
Claims 1-8 (in part) are further withdrawn from further consideration by the Examiner as being drawn to non-elected inventions under 37 CFR 1.142(b). The withdrawn subject matter is patentably distinct from the elected subject matter as it differs in structure and element and would require separate search considerations. In addition, a reference that anticipates one invention would not render obvious the other invention.

### **Elected and Examined Subject Matter**

The scope of the invention of the elected subject matter and the examined subject matter is as follows:

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A process for producing an anthracene diether represented by the Formula (I)

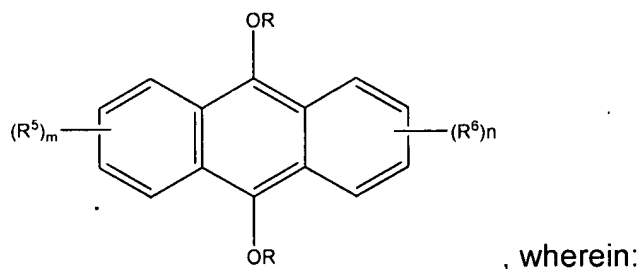


**R** is an alkyl group, each of **R**<sup>5</sup> and **R**<sup>6</sup> is a substituent inert to etherification, and each of **m** and **n** is a integer of from 0 to 4, which comprises reacting a etherifying agent and an alkali salt of a 9,10- anthracenediol compound to produce the anthracene diether.

#### Non-elected and Non-examined Subject Matter

The scope of the invention of the elected subject matter and the examined subject matter is as follows:

A process for producing an anthracene diether represented by the Formula (I)



**R** is an allyl group, an aryl group, a benzyl group, a hydroxyalkyl group or an alkoxyalkyl group. The process comprises reacting a etherifying agent and an alkali salt of a 9,10- anthracenediol compound to produce the anthracene diether.

As a result of the election and the corresponding scope of the invention identified supra, claims 1-8 (in part) are withdrawn from further consideration pursuant to 37 CFR 1.142 (b) as being drawn to non-elected inventions. The withdrawn compounds contain varying functional groups which are chemically recognized to differ in structure, function, and reactivity.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 5 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 5 and 10 contain the term "a substituent inert to etherification" as indefinite. Applicants need to clearly define the definition of the term, or by incorporating references to define the terms. The examiner interprets  $R^5$  and  $R^6$  as H or alkyl.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

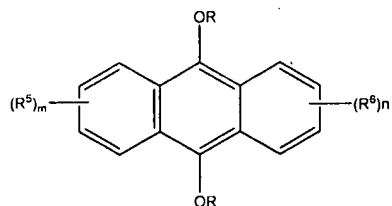
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 2, and 5-8 are rejected under 35 U.S.C. 103 (a) as unpatentable over Seitz et al. Synthesis, p686-688 (1986).

Applicants instantly elected invention in claims 1, 2, and 5-8 claim a process for producing an anthracene diether represented by Formula (I)

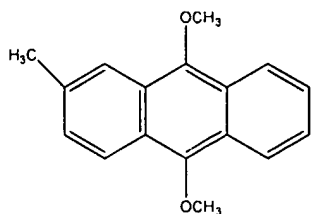


, wherein:

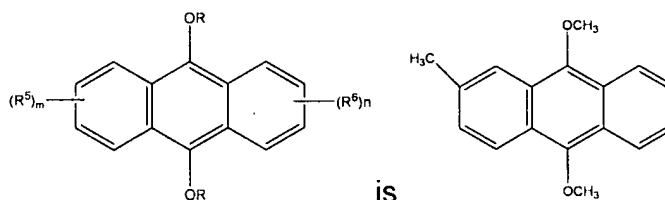
R is an alkyl group, each of R<sup>5</sup> and R<sup>6</sup> is a substituent inert to etherification, and each of m and n is a integer of from 0 to 4, which comprises reacting an etherifying agent with an alkali salt of a 9,10- anthracenediol compound to produce the anthracene diether in an aqueous medium in the presence of a quaternary ammonium compound.

Determination of the scope and content of the prior art (MPEP §2141.01)

Seitz et al. teach a specific process for producing anthracene diether compound



of Formula by reacting methyl iodide with alkali salt of a 9,10-anthracenediol in an aqueous medium of water and dichloromethane in the presence of phase transfer agent methyltrialkyl(C8-10)ammonium-chloride (Adogen 464<sup>®</sup>) (see reaction 6, on page 687). This process reads on the instant claims 1, 2, and 5-8 wherein:



An anthracene diether of formula (I) wherein  $R^5 = R^6 = H$  and  $R$  is methyl; an aqueous medium containing dichloromethane and water; an etherifying agent is methyl iodide; and the quaternary ammonium compound is methyltrialkyl(C8-10)ammonium-chloride (Adogen 464<sup>®</sup>).

Ascertainment of the difference between the prior art and the claims (MPEP §2141.02)

The difference between the prior art of Seitz et al. and the instantly claimed process is that Seitz et al. do not disclose the exact same mixing procedure of the alkali salt of the 9,10-anthracenediol and etherifying agent. Instead, the alkali salt of the 9,10-anthracenediol in the prior art is used as an intermediate, which is converted to the 9,10-anthracene diether in aqueous medium as claimed by the instant claims.

Finding of prima facie obviousness--rational and motivation (MPEP §2142-2413)

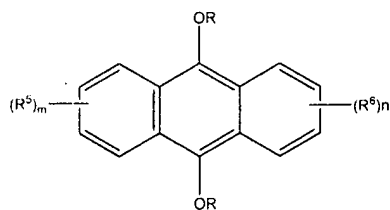
To those skilled in the chemical art, the selection of reaction conditions is more optimization by more modification of routine experimentation and within one skilled in

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the art. The difference of mixing starting materials is not so advance and obvious to the one skilled in the art. A prima facie case of obviousness may be rebutted in optimizing a variable only when results are unexpectedly good. In re Boesch, 205 USPQ 215.

Claims 3 and 4 are rejected under 35 U.S.C. 103 (a) as unpatentable over Seitz et al. Synthesis, p686-688 (1986) in view of John McMurry Organic Chemistry, p 343-344, and 355, 2<sup>nd</sup> Edition.

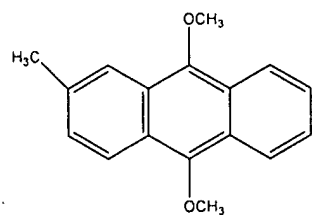
Applicants instantly elected invention in claims 3 and 4 claim a process for producing an anthracene diether represented by Formula (I)



, wherein: **R** is an alkyl group, each of **R<sup>5</sup>** and **R<sup>6</sup>** is a substituent inert to etherification, and each of **m** and **n** is a integer of from 0 to 4. The process comprises reacting an etherifying agent with an alkali salt of a 9,10-anthracenediol compound to produce an anthracene diether in an aqueous medium containing polar solvent.

Determination of the scope and content of the prior art (MPEP §2141.01)

Seitz et al. teach a specific process for producing anthracene diether of Formula



by reacting methyl iodide with alkali salt of the 9,10-anthracenediol in an aqueous medium of water and dichloromethane. Dichloromethane



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is a medium polar solvent. Its dielectric constant ( $\epsilon$ ) is 8.93, which is more polar than  $\text{CHCl}_3$  ( $\epsilon = 4.8$ ) and ethyl acetate ( $\epsilon = 6.0$ ). John McMurry lists common organic solvent can be used for  $\text{SN}_1$  and  $\text{SN}_2$  alkylation reaction including many polar and polar aprotic solvents. Such solvent includes HMPA, DMF, DMSO and halogenated solvents.

Ascertainment of the difference between the prior art and the claims (MPEP §2141.02)

The difference between the prior art of Seitz et al. and the instantly claimed process is that Seitz et al. do not disclose a polar aprotic solvent, instead using medium-polar dichloromethane.

Finding of prima facie obviousness--rational and motivation (MPEP §2142-2413)

Using these solvents for alkylation is obvious to one skilled in the art. The polar and polar aprotic solvents, which are not disclosed by the prior art, is suggested by John McMurry. John McMurry lists organic solvents commonly used for  $\text{SN}_1$  and  $\text{SN}_2$  alkylation reaction. To those skilled in the chemical art, the selection of reaction conditions is more optimization by more modification of routine experimentation and within one skilled in the art. A prima facie case of obviousness may be rebutted in optimizing a variable only when results are unexpectedly good. In re Boesch, 205 USPQ 215.

**Conclusion**

No claims are allowed.

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***Telephone Inquiry***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yong Chu whose telephone number is 571-272-5759. The examiner can normally be reached between 7:00 am - 3:30 pm EST.

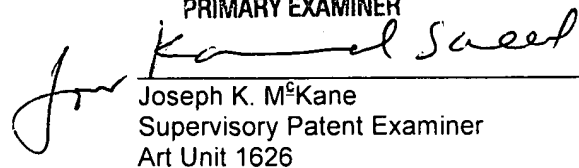
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph K. McKane can be reached on 571-272-0699. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Yong Chu, Ph.D.  
Patent Examiner  
Art Unit 1626

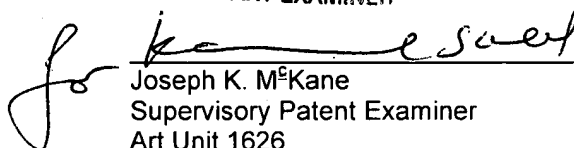
KAMAL A. SAEED, PH.D.  
PRIMARY EXAMINER

  
Joseph K. McKane  
Supervisory Patent Examiner  
Art Unit 1626

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
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